REMARKS

Claims 1-19 are pending in the present application.

The drawings were objected to under 37 C.F.R. § 1.83(a) because they failed to show "upper orifice end of the central tube [3]" as described in the specification.

Claims 1-10 and 14-19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Beisswenger et al.,U.S. Patent No. 4,716,856 ("Beisswenger") in view of Lapple et al., U.S. Patent No. 3,578,798 ("Lapple").

Claims 11-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Beisswenger in view of Lapple and in further view of Bresser et al., U.S. Patent No. 5,560,762 ("Bresser").

Claim 1 has now been amended. The specification and the drawings have also been amended. No new matter has been added. Reconsideration of the application in view of the amendments and following remarks is respectfully requested.

Objection to the Drawings

The drawings were objected to under 37 C.F.R. § 1.83(a) because they failed to show "upper orifice end of the central tube [3]" as described in the specification.

Figs. 1-3 have now been amended to show the upper orifice end/region of the central tube. The upper orifice end/region has now been labeled with reference numeral 3A, and the specification has also been amended to incorporate reference numeral 3A.

Withdrawal of the objection to the drawings is respectfully requested.

Rejections under 35 U.S.C. §103

Claims 1-10 and 14-19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Beisswenger et al.,U.S. Patent No. 4,716,856 ("Beisswenger") in view of Lapple et al., U.S. Patent No. 3,578,798 ("Lapple"). Claims 11-13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Beisswenger et al. in view of Lapple et al. and further in view of Bresser et al. (U.S. Patent No. 5,560,762).

Beisswenger describes a fluidized bed system for burning carbonaceous fuel to provide steam by introducing fuel into a fluid bed in an upright reactor wherein the material is fluidized by a gas introduced at the bottom of the bed. See Beisswenger, column 1, lines 5-7 and column 2, lines 30-34.

Lapple describes a cyclonic fluid bed reactor including a tube 14 with passages 36 for the discharge of materials from the fluidized bed 33 into the tube 14 and vertically spaced rows of air inlets 25 to create a spiral movement in the tube 14. The solids discharged from the fluidized bed 33 through the passages 36 into the tube 14 are entrained, spiral upward into and are separated from the gas in the freeboard space 37, and are reintroduced into the fluidized bed 33 by gravity. See Lapple, the title, column 2, lines 12-19, 43-58 and 65-69, and Figs. 1 and 2.

Bresser describes a process for the heat treatment of fine-grained iron ore in a circulating fluidized bed system for the conversion of the heat-treated iron ore to metallic iron in a conventional fluidized bed. See Bresser, column 1, liens 9-11 and column 2, lines 15-17 and 29-31.

Independent claim 1 of the present application has now been amended to recite

> introducing from below a first gas or gas mixture through at least one gas supply tube with an upper orifice into a mixing chamber of the fluidized-bed reactor so as to entrain solids from a stationary annular fluidized bed into the mixing chamber when passing through the upper orifice, the at least one gas supply tube being at least partly surrounded by the stationary annular fluidized bed extending beyond the upper orifice, the solids being entrained from the stationary annular fluidized bed extending beyond the upper orifice upon the first gas or gas mixture passing through an upper orifice region;
>
> ... and

> adjusting gas velocities of the first gas or gas mixture and the fluidizing gas for the stationary annular fluidized bed such that the Particle-Froude-Number is a) in the at least one gas supply tube between 1 and 100, b) in the stationary annular fluidized bed between 0.02 and 2, and c) in the mixing chamber between 0.3 and 30.

Support for this amendment can be found in the specification, for example, at page 6, lines 11-17 and page 9, lines 17-20 and Figs. 1-3.

It is respectfully submitted that neither of Beisswenger nor Lapple teach or suggest least one gas supply tube being at least partly surrounded by a stationary annular fluidized bed extending beyond the upper orifice, with the solids being entrained from the stationary annular fluidized bed extending beyond the upper orifice upon the first gas or gas mixture passing through an upper orifice region as now recited in claim 1. As noted by the Examiner, Beisswenger does not teach a gas supply tube surrounded by a stationary annular fluidized bed and does not teach the entrainment of solids from the stationary annular fluidized bed. See July 8, 2009 Office Action, Claim Rejections, page 5, first complete paragraph. Lapple does not cure this defect. In contrast, Lapple describes a fluidized bed construction with a central tube 14 "above the normal level of the fluidized bed" and not a "stationary annular fluidized bed extending beyond the upper orifice" as recited in claim 1. See Lapple, column 1, lines 26-30 and Fig. 1. Lapple furthermore does not entrain solids from a stationary annular fluidized bed extending beyond the upper orifice upon the first gas or gas mixture passing through the upper orifice region as is recited in claim 1. In contrast, Lapple describes a system where the central tube 14 has passageways through which particles are introduced into the central tube 14. See Lapple, Fig. 2. Lapple itself states:

> The wall of the tube is provided with one or more passageways therethrough which are arranged tangentially with respect to the wall of the tube and communicate with the surrounding fluidized bed. With this arrangement, granular or particle-form material will be withdrawn from the fluidized bed and introduced tangentially into the central tube where the materials are entrained by the flowing fluid, lifted to the top of the tube and then discharged outwardly into the annular space surrounding the tube to separate from the fluid.

See Lapple, column 1, lines 31-40 and Fig. 1.

Fig. 1 of Lapple also clearly shows that the particles are ejected from tangentally arranged passages 36 into the central portion of tube 14. As per Fig. 1, this occurs towards the middle section of tube 14 and not at an upper orifice region as is recited by claim 1. Moreover, the design of Lapple makes it impossible to entrain solids from a stationary annular fluidized bed extending beyond any upper orifice of the tube 14 because, as already stated above, the tube 14 of Lapple extends beyond the level of the fluidized bed.

It is furthermore respectfully submitted that neither Beisswenger nor Lapple teach or suggest adjusting gas velocities of the first gas or gas mixture and the fluidizing gas for the stationary annular fluidized bed such that the Particle-Froude-Number is a) in the at least one gas supply tube between 1 and 100, b) in the stationary annular fluidized bed between 0.02 and 2, and c) in the mixing chamber between 0.3 and 30., as recited in claim 1. In contrast, Beisswenger merely describes a typical Froude number range for a circulating fluidized bed reactor that may define overall reactor operating conditions. See Beisswenger, column 2, lines 48-69. Beisswenger nowhere teaches establishing differing Froude ranges in different portions of the chamber of an annular fluidized bed reactor, i.e., the gas supply line, annular fluidized bed and mixing chamber, as recited in claim 1. Nor therefore does Beisswenger teach the combination of Froude number ranges recited in claim 1. Regarding Lapple, that reference does not teach Froude numbers at all. Lapple moreover recites an annular reactor. A person of ordinary skill in the art would therefore not have attempted to apply the Froude numbers of Beisswenger relating to circulating fluidized bed reactor to control the annular fluidized bed reactor of Lapple.

Because each of Beisswenger and Lapple are missing at least the aforementioned features recited in claim 1, it is respectfully submitted that any combination of Beisswenger and Lapple, to the extent proper, could not render claim 1 or any of its dependent claims obvious. Nor does Bresser cure the deficiencies of a combination of Beisswenger and Lapple. Therefore, a combination of Beisswenger in view of Lapple and further in view of Bresser, to the extent proper, could not render dependent claims 11-13 obvious.

For the above reasons, reconsideration and withdrawal of the rejections to claims 1-10 and 14-20 under 35 U.S.C. § 103(a) based on Beisswenger in view of Lapple, and of claims 11-13 under

35 U.S.C. § 103(a) based on Beisswenger in view of Lapple and further in view of Bresser, is respectfully requested.

CONCLUSION

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

The Commissioner is hereby authorized to charge any unpaid fees deemed required in connection with this submission, including any additional filing or application processing fees required under 37 C.F.R. §1.16 or 1.17, or to credit any overpayment, to Deposit Account No. 04-0100.

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Respectfully submitted,

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